

INSECTS ASSOCIATED WITH THE FLOWERS OF THE COCONUT PALM, *Cocos nucifera* L., IN HAWAII^{1,2}

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INTRODUCTION

Many different species of insects are found on the coconut palm flowers (*Cocos nucifera* L.). A list of these provides a useful starting point for studies of pollination or of insect-transmitted diseases of this species. These lists are available from only a few countries where the coconut is grown. Aldaba (1921) lists 8 species found in the Philippines; Liyanage (1957) lists 13 from Ceylon; Lever (1933a, 1933b, 1934, 1935) and Pagden and Lever (1935) list 25 from the British Solomon Islands, and Furtado (1924) lists 5 found in Singapore.

From August, 1963, through June, 1964, a study concerning the pollination of the coconut palm in Hawaii was made. During that period, insects collected and their frequency of occurrence were noted.

MATERIALS AND METHODS

The occurrence of insects was determined and species were collected from coconut palms located on the University of Hawaii campus, two residences in Aiea and two in Waimanalo. Other studies were made at various sites around the island. Due to the difficulty in climbing the trees, collections were restricted to those less than 9 m tall.

The relative frequency of occurrence of each species on the flowers arbitrarily was rated as rare, occasional and frequent. In most cases, the species listed as rare were observed on the flowers only once or twice. Those rated as frequent were found at most observations and constituted a larger percentage of the total insect population. Those rated as occasional fell between the other two classifications. Establishment of the relative frequency of each species was difficult due to the problem in recognizing the different species on the flowers during observations (especially the small Diptera) and to the wide variation in the species and their numbers from tree to tree and site to site.

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RESULTS

The insects collected are listed in Table 1. Fifty-one different species were found: 27 Diptera; 15 Hymenoptera; 4 Coleoptera; 3 Lepidoptera and 1 each of Dermaptera and Hemiptera. *Oscinella formosa* Becker, often found in abundance on the staminate flowers, apparently has not been collected previously in Hawaii. Most of the insects listed below seldom were found on the pistillate flowers, therefore, the ratings were based mainly upon the relative frequency of occurrence on the staminate flowers. Those insects found most often on both flowers are designated by an asterisk.

Table 1. Insects observed on coconut flowers and their relative frequency of occurrence.

INSECT	RELATIVE FREQUENCY		
	Rare	Occasional	Frequent
DIPTERA			
<i>Atherigona excisa</i> (Thomson)			×
<i>Bercaea haemorrhoidalis</i> (Fall.)	×		
<i>Oscinella formosa</i> Becker			×
<i>Dacus cucurbitae</i> Coq.		×	
<i>D. dorsalis</i> Hendel		×	
<i>Desmometopa</i> spp.			×
<i>Eristalis arvorum</i> (F.)		×	
<i>Fannia pusio</i> (Wied.)	×		
<i>Hecamede persimilis</i> Hendel	×		
<i>Helicobia morionella</i> Ald.			×
<i>Holoplusia guamensis</i> (Johannsen)	×		
<i>Lamprolonchaea aurea</i> Macq.		×	
<i>Megaselia (Aphiochaeta) setaria</i> (Mall.)	×		
<i>Milichiella lacteipennis</i> (Loew)	×		
<i>Musca domestica</i> L.		×	
<i>Parasarcophaga misera</i> (Walk.)	×		
<i>Phaenicia cuprina</i> (Wied.)	×		
<i>P. sericata</i> (Meigen)		×	
<i>Physiphora aenea</i> F.			×
<i>Rhinia testacea</i> R. D.		×	
<i>Sarcophagula occidua</i> (F.)			×
<i>Scatopse fuscipes</i> Meigen		×	
<i>Scholastes bimaculatus</i> Hendel		×	
<i>Sepsis biflexuosa</i> Strobl.	×		
<i>Siphunculina signata</i> Woll.	×		
<i>Trichopoda pennipes</i> F.	×		
<i>Volucella obesa</i> (F.)		×	
HYMENOPTERA			
<i>Ampulex compressa</i> (F.)	×		
* <i>Apis mellifera</i> L.			×

— continued —

Table 1 (cont.). Insects observed on coconut flowers and their relative frequency of occurrence

INSECT	RELATIVE FREQUENCY		
	Rare	Occasional	Frequent
<i>Camponotus maculatus hawaiiensis</i> For.	×		
<i>Eumenes</i> sp.	×		
<i>Eupelmus cushmani</i> (Crawford)	×		
<i>Halictus</i> sp.	×		
<i>Monomorium</i> sp.	×		
* <i>Paratrechina</i> (<i>Prenolepis</i>) <i>longicornis</i> (Latr.)		×	
* <i>Pheidole megacephala</i> (F.)			×
<i>Plagiolepis mactavishi</i> Wheeler		×	
<i>Polistes aurifer</i> Perk.		×	
* <i>P. exclamans</i> (Vier.)			×
* <i>P. macaensis</i> (F.)			×
* <i>P. olivaceus</i> (DeGeer)			×
<i>Stomatocerus pectorvus</i> (Girautl.)	×		
COLEOPTERA			
<i>Ceresium simplex</i> Gyll.	×		
<i>Diocalandra taitensis</i> (Guerin)	×		
<i>Exillis lepidus</i> Jordon	×		
<i>Trogoderma ornatum</i> (Say)	×		
LEPIDOPTERA			
<i>Mestolobes</i> sp.	×		
<i>Pyroderces rileyi</i> (Walsm.)	×		
<i>Spodoptera mauritia</i> (Boisd.)	×		
DERMAPTERA			
* <i>Chelisoches morio</i> (F.)			×
HEMIPTERA			
<i>Nezara viridula</i> (L.)	×		

The large numbers of insects associated with coconut palm flowers may be due to the presence of nectar and pollen, or both. Since both kinds of flowers produce nectar, the presence of most of the insects on staminate flowers may be attributed to preference for pollen as food. Also, the staminate flowers are more abundant than the pistillate flowers.

SUMMARY

Fifty-one different species of insects were collected from the flowers of the coconut palm. The insects found most often on both flowers were the honey bee *Apis mellifera* L.; black earwig *Chelisoches morio* (F.); wasps *Polistes exclamans* (Vier.), *P. olivaceus* (DeGeer) and *P. macaensis* (F.); ants *Paratrechina* (*Prenolepis*) *longicornis* (Latr.) and *Pheidole megacephala* (F.). The chloropid fly, *Oscinella formosa* Becker, is reported from Hawaii for the first time.

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